IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:	Thomas N. Chalin, et al.
Serial No.:	10/600,051
Filed:	June 20, 2003
Entitled:	SUSPENSION SYSTEM HAVING A COMPOSITE BEAM
Group Art Unit:	3616
Examiner:	F. Fleming

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Appellants hereby timely submit this Appeal Brief under the provisions of 37 CFR §41.37 and respectfully request consideration thereof before the Board of Patent Appeals and Interferences. Appellants' Notice of Appeal was filed on October 26, 2006, appealing to the Board from the decision of the examiner, mailed August 25, 2006, finally rejecting the claims of the above-identified patent application.

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REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, Watson & Chalin Manufacturing, Inc. of McKinney, Texas.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to appellants, the appellants' legal representatives or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-53 were originally filed in the present application. Claims 3-5, 10-28, 31-36, 42, 43, 45, 47, 48, 50 and 51 are presently withdrawn from consideration pursuant to a requirement for election of species.

Claims 1, 2, 6-9, 29, 30, 37-41, 44, 46, 49, 52 and 53 are currently pending and being considered in the application.

Claims 1, 2, 6-8, 29, 30, 37-41, 44, 46, 49, 52 and 53 are rejected.

Claim 9 is objected to for depending from a rejected base claim, but is otherwise indicated as being allowable.

Claims 1, 2, 6-9, 29, 30, 37-41, 44, 46, 49, 52 and 53 are being appealed.

STATUS OF AMENDMENTS

No amendments have been filed after the date of the August 25, 2006 Office Action.

SUMMARY OF CLAIMED SUBJECT MATTER

In one important aspect of the invention recited in independent claim 1 (an embodiment of which is depicted in FIG. 11 of the drawings), a vehicle suspension system includes an axle 132 and a beam 152 interconnected between the axle and a frame of a vehicle. The embodiment depicted in FIG. 11 is described at page 15, line 7 to page 16, line 6 of the specification.

The beam has opposite ends 136, 138, an elongated body 152 extending between the opposite ends, and a metal end connection 38 at one of the opposite ends. The body 152 is made of a composite material (see page 15, lines 15-19). Claim 1 is also generic to multiple embodiments of the invention depicted in, for example, FIGS. 2-10 of the drawings.

In another important aspect of the invention recited in independent claim 29 and depicted in FIGS. 3A&B, the body 32 is made of a composite material and has a cross-section with at least two flanges 50, 52, 56, 58 and a web 54, 60 extending between the flanges. The embodiments depicted in FIGS. 3A&B are described at page 8, line 8 to page 9, line 16 of the specification.

Therein is described a suspension system for a vehicle having a frame 16, with the suspension system including an axle 24 and a beam 30 interconnected between the vehicle frame and the axle. The beam 30 has opposite ends, an elongated body 32 extending between the opposite ends, an axle end connection 34 at one of the opposite ends, and a frame end connection 36 at the other of the opposite ends. The body 32 is made of a composite material (see page 6, lines 7-19) and has a cross-section with at least two flanges 50, 52, 56, 58 and a web 54, 60 extending between the flanges (see page 8, lines 8-16).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2, 6-8, 29, 30, 37-41, 44, 46, 49, 52 and 53 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,788,263 to VanDenberg in view of U.S. Patent No. 3,756,646 to Gimlett, et al.

ARGUMENT

The present invention advances the art of constructing vehicle suspension systems by providing a light weight beam and axle assembly in a suspension system. As part of the advancements in the art, the applicants have described how to make and use several different configurations of light weight beam and axle assemblies (see FIGS. 2-11). As will be appreciated from even a cursory review of the drawings and accompanying description, the applicants have uniquely solved the problems associated with use of composite materials in suspension systems.

The rejections made in the Office Action merely cite the Gimlett reference for its teaching of the use of a composite material in a railroad axle, and then summarily conclude that it would be obvious to make axles and beam bodies of a composite material. However, the claims recite more than this. The claims recite a particular configuration of a beam in a particular type of suspension system, and the invention is clearly not rendered obvious in view of the teachings of the VanDenberg and Gimlett references.

Rejections under 35 USC §103(a) over VanDenberg in view of Gimlett

The first step in the *Graham v. John Deere* factual inquiries, which are used as a background for determining obviousness, is to determine the scope and content of the prior art. In the present case, all of the claims being considered (other than claim 9) have been rejected as obvious over a proposed combination of the teachings of the VanDenberg and Gimlett references. An analysis of these references follows.

VanDenberg describes a suspension system 1 (see FIG. 2) which includes a laminated beam 15 pivotably connected at one end to a hanger bracket 5 attached to a frame 7. At its other end, the beam 15 is connected to an axle 19. Repeatedly, VanDenberg stresses the need for a low modulus of elasticity at the end connections of the beam 15 (see, for example, col. 3, lines 46-50 and 60-64, and col. 6, lines 9-14).

One reason for the low modulus of elasticity required by the VanDenberg suspension system is the need for allowing the axle to deflect and assume an out-of-round shape at the beam-axle connection (e.g., see col. 6, lines 14-18). If the low modulus of elasticity were not provided, VanDenberg asserts that the beam material could fracture (see col. 3, lines 46-50).

Thus, VanDenberg's solution to the problem of how to utilize light weight materials in the construction of suspension system components is to provide the materials with a low modulus of elasticity, so that the materials can flex and permit other suspension system components (such as the axle) to deflect. This is clearly not the solution described and claimed in the present application.

Gimlett describes a railway wheel and axle assembly, in which an axle 2 has a metal core 4 with fiber reinforcement 10 wrapped externally on the core. The fiber reinforcement 10 also forms an inner portion of wheels 1 at either end of the axle 2.

It is important to note that the Gimlett railway wheel and axle assembly is completely different from the type of suspension system described and claimed in the present application. There are no pivoting beams at all in the Gimlett railway assembly. The Gimlett railway assembly instead has an axle 2 which rotates with its wheels 2. No person skilled in the suspension system art would even consider substituting any component of the Gimlett railway assembly in the VanDenberg trailer suspension system.

Claims 1, 6, 7 and 49

Independent claim 1 recites that a beam body made of a composite material has a metal end connection at one of its opposite ends. For example, in the embodiment of FIG. 11 discussed above, a sleeve 38 for a pivot bushing 20 is secured at one end of a composite beam body 152. Dependent claim 49 also recites a metal beam end connection.

There simply is no disclosure in VanDenberg of such a metal end connection at one end of a composite beam. VanDenberg does describe a bushing sleeve 30, but does

not mention of what material the sleeve is made. In keeping with the teachings in the VanDenberg specification, the sleeve is presumably made of a low modulus material (not metal, which has a relatively high modulus of elasticity) to prevent fracturing and to permit deflection.

Furthermore, VanDenberg teaches away from the use of conventional pivot bushings (see col. 3, lines 23-30, 40 and 41), and so it cannot be assumed that VanDenberg would use any particular type of conventional materials in the pivot end connection. Perhaps, in the interest of saving weight, reducing manufacturing cost, etc., VanDenberg would use a composite material instead of metal to make the bushing sleeve 30. This is purely speculation since, as noted above, VanDenberg does not describe a metal end connection on a composite beam body.

Instead, VanDenberg stresses the need for a low modulus of elasticity at the beam end connections (e.g., col. 3, lines 46-50 and 60-64, and col. 6, lines 9-14). Metals, on the other hand, typically have relatively high moduli of elasticity. Thus, VanDenberg clearly teaches away from the use of metal beam end connections.

These deficiencies in the VanDenberg reference are not cured at all by combining it with the Gimlett reference. As discussed above, Gimlett does not describe any beam interconnected between an axle and a vehicle frame, and so it is unquestionable that Gimlett also does not describe a composite beam body with a metal end connection.

As stated in MPEP §2142, for a *prima facie* case of obviousness to be established, "... the reference (or references when combined) must teach or suggest all the claim limitations." In the present case, all the claim limitations have clearly not been taught or suggested by the combination of the VanDenberg and Gimlett references. For at least this reason, the Board is respectfully requested to direct the examiner to withdraw the claim rejections.

As stated in MPEP §2145, it is improper to combine references where the references teach away from their combination. In the present case, at least the VanDenberg reference clearly teaches away from the invention recited in the claims. Furthermore, it is unclear how or why a person skilled in the art would go about incorporating any of the railway wheel and axle assembly of Gimlett into the

VanDenberg trailer suspension system. They are completely different configurations which are not combinable at all and, at least in this sense, they teach away from their combination. For this additional reason, the Board is respectfully requested to direct the examiner to withdraw the claim rejections.

As stated in MPEP §2143.01 III., the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In the present case, the very opposite of this principle is true. Instead of suggesting the desirability of the combination, at least the VanDenberg reference clearly teaches directly away from the claimed invention. There has not even been a reasonable showing of how any teaching found in the Gimlett reference could possibly be combined with the teachings of the VanDenberg reference. For this additional reason, the Board is respectfully requested to direct the examiner to withdraw the claim rejections.

Claim 2

This claim is dependent from claim 1 and, for the reasons discussed above, is not rendered obvious by the teachings of VanDenberg and Gimlett. In addition, this claim recites that the metal end connection is a frame pivot connection. As discussed above, VanDenberg does not describe a metal end connection on a suspension system beam. In addition, VanDenberg does not describe a frame pivot connection which is a metal end connection. Furthermore, VanDenberg teaches directly away from use of metal end connections. For these additional reasons, the Board is respectfully requested to direct the examiner to withdraw the rejection of claim 2.

Claims 8, 29, 30, 37, 39-41, 46, 52 and 53

Claim 8 is dependent from claim 1 and, for the reasons discussed above, is not rendered obvious by the teachings of VanDenberg and Gimlett. Furthermore, claims 8, 29 and 46 recite in one form or another an I or H-beam shape of the beam body cross-section with a web extending between flanges thereof. VanDenberg does not disclose

such a beam shape. Instead, VanDenberg describes his beam 15 as having top and bottom walls 34, 35 and side walls 36 (see col. 5, lines 58-60 and col. 6, lines 53-59).

A casual reader of the VanDenberg reference might initially be mislead by not recognizing at first that the drawing figures of VanDenberg show the beam 15 in cross-section. The beam 15 has a rectangular box shape (formed by the top, bottom and side walls 34, 35, 36) and not an I or H-beam shape. Thus, VanDenberg and Gimlett do not disclose the combination of elements and limitations recited in these claims, and for this additional reason the Board is respectfully requested to direct the examiner to withdraw the claim rejections.

Claim 44

This claim is dependent from claim 29 and, for the reasons discussed above, is not rendered obvious by the teachings of VanDenberg and Gimlett. In addition, claim 44 recites that there is a greater density of fibers in the flanges of the beam body. As discussed above in regarding the rejections of claims 8, 29 and 46, VanDenberg clearly does not disclose an I or H-beam shape of the beam body.

VanDenberg also does not disclose any flanges of a beam body having a greater density of fibers than a web of the beam body. The examiner has acknowledged this by indicating that claim 9 contains allowable subject matter. Thus, the Board is respectfully requested to direct the examiner to withdraw the rejection of claim 44.

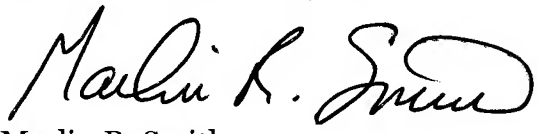
Claim 38

This claim is indirectly dependent from claim 29 and, for the reasons discussed above, is not rendered obvious by the teachings of VanDenberg and Gimlett. In addition, claim 38 recites a direct connection between the axle and the web of the beam body. As discussed above, VanDenberg does not disclose a beam body having a web and flanges. In addition, VanDenberg does not disclose a direct attachment between such a web and an axle.

Instead, VanDenberg describes attachment of his top and bottom walls 34, 35 to the axle 19. Gimlett describes an axle which rotates in use and which could not in any conceivable way have a direct connection to a beam body. Thus, VanDenberg and Gimlett do not disclose the combination of elements and limitations recited in claim 38. For this additional reason, the Board is respectfully requested to direct the examiner to withdraw the rejection of claim 38.

The Board is also respectfully requested to direct the examiner to consider in the present application all of the claims which are dependent from the allowable claims, but which were formerly restricted out of the application pursuant to a requirement for election of species.

Respectfully submitted,
SMITH IP SERVICES, P.C.



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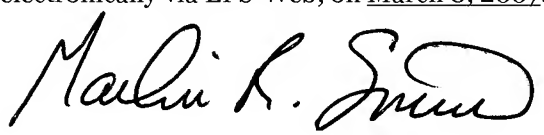

CLAIMS APPENDIX

1. A suspension system for a vehicle having a frame, the suspension system comprising:

an axle; and

a beam interconnected between the vehicle frame and the axle, the beam having opposite ends, an elongated body extending between the opposite ends, and a metal end connection at one of the opposite ends, the body being made of a composite material.

2. The suspension system according to claim 1, wherein the end connection is a frame pivot connection.

3. The suspension system according to claim 1, wherein the end connection is an axle connection.

4. The suspension system according to claim 3, wherein the axle is made of an axle composite material.

5. The suspension system according to claim 1, wherein the end connection has a cavity formed therein, the body being received in the cavity.

6. The suspension system according to claim 1, wherein the end connection is received internally in the body.

7. The suspension system according to claim 1, wherein the body has a nonuniform distribution of fibers in the composite material.

8. The suspension system according to claim 1, wherein the body has a generally I-shaped cross-section.

9. The suspension system according to claim 8, wherein flanges of the I-shaped cross-section have a greater density of fiber than a web of the cross-section extending between the flanges.

10. The suspension system according to claim 1, wherein the body has a generally H-shaped cross-section.

11. The suspension system according to claim 10, wherein upper and lower end portions of flanges of the H-shaped cross-section have a greater density of fiber than a web of the cross-section extending between the flanges.

12. The suspension system according to claim 1, wherein the body has a generally tubular cross-section.

13. The suspension system according to claim 12, wherein upper and lower wall portions of the tubular cross-section have a greater density of fiber than central wall portions of the cross-section.

14. The suspension system according to claim 1, wherein the end connection includes a sleeve attached to a body coupling structure.

15. The suspension system according to claim 14, wherein the structure receives the body internally therein.

16. The suspension system according to claim 14, wherein the body receives the structure internally therein.

17. The suspension system according to claim 14, wherein the sleeve and body coupling structure are integrally formed.

18. The suspension system according to claim 14, wherein the sleeve encircles a pivot bushing.

19. The suspension system according to claim 18, wherein the pivot bushing pivotably connects the end connection to the vehicle frame.

20. The suspension system according to claim 18, wherein the pivot bushing pivotably connects the end connection to the axle.

21. The suspension system according to claim 14, wherein the sleeve extends at least partially about the axle.

22. The suspension system according to claim 1, wherein the end connection includes an axle coupling structure attached to the axle, and a body coupling structure attached to the body.

23. The suspension system according to claim 22, wherein the body coupling structure receives the body internally therein.

24. The suspension system according to claim 22, wherein the body receives the body coupling structure internally therein.

25. The suspension system according to claim 22, wherein the axle coupling structure and the body coupling structure are integrally formed.

26. The suspension system according to claim 22, wherein the axle coupling structure extends at least partially about the axle.

27. The suspension system according to claim 22, wherein the axle coupling structure is pivotably attached to the axle.

28. The suspension system according to claim 22, wherein the axle is made of a composite material.

29. A suspension system for a vehicle having a frame, the suspension system comprising:

an axle; and

a beam interconnected between the vehicle frame and the axle, the beam having opposite ends, an elongated body extending between the opposite ends, an axle end connection at one of the opposite ends, and a frame end connection at the other of the opposite ends, the body being made of a composite material and having a cross-section with at least two flanges and a web extending between the flanges.

30. The suspension system according to claim 29, wherein the flanges wrap outwardly about the axle end connection.

31. The suspension system according to claim 29, wherein the flanges are attached to an axle coupling structure of the axle end connection.

32. The suspension system according to claim 31, wherein the structure is rigidly attached to the axle.

33. The suspension system according to claim 31, wherein the structure is pivotably attached to the axle.

34. The suspension system according to claim 31, wherein the structure extends at least partially about the axle.

35. The suspension system according to claim 31, wherein the structure is welded to the axle.

36. The suspension system according to claim 31, wherein the axle is made of an axle composite material.

37. The suspension system according to claim 29, wherein the flanges are attached directly to the axle.

38. The suspension system according to claim 37, wherein the web is attached directly to the axle.

39. The suspension system according to claim 37, wherein the flanges extend at least partially about the axle.

40. The suspension system according to claim 37, wherein the axle is made of an axle composite material.

41. The suspension system according to claim 29, wherein the flanges wrap outwardly about the frame end connection.

42. The suspension system according to claim 41, wherein the flanges are attached to a frame coupling structure of the frame end connection.

43. The suspension system according to claim 42, wherein the frame coupling structure extends about a pivot bushing.

44. The suspension system according to claim 29, wherein the flanges have a greater density of fiber than the web.

45. The suspension system according to claim 29, wherein upper and lower end portions of the flanges have a greater density of fiber than the web.

46. The suspension system according to claim 29, wherein the body cross-section is generally I-shaped.

47. The suspension system according to claim 29, wherein the body cross-section is generally H-shaped.

48. The suspension system according to claim 29, wherein the frame end connection includes a structure which straddles a hanger bracket attached to the vehicle frame.

49. The suspension system according to claim 29, wherein at least one of the axle and frame end connections is made of metal.

50. The suspension system according to claim 29, wherein each of the axle and frame end connections is made of metal.

51. The suspension system according to claim 29, wherein at least one of the axle and frame end connections has a cavity formed therein, the body being received in the cavity.

52. The suspension system according to claim 29, wherein the body has a nonuniform distribution of fiber therein.

53. The suspension system according to claim 29, wherein the axle is made of a composite material.

EVIDENCE APPENDIX

(none)

RELATED PROCEEDINGS APPENDIX

(none)